Space Weather Forecast

Issued on Monday, 26 December 2022 at 01:29 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

Space Weather Forecast Headline: Potential Earth-directed CMEs on 26th, 27th and 29th with possible G1/Minor Storms and low risk of G2.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low over the last 24 hours with only COMMON-class flares observed. There are six sunspot regions on the visible disc. One large and complex region and 5 smaller and simpler ones.

One coronal mass ejection occurred from the vicinity of the aforementioned large sunspot with a high value common class flare early on 25th, this coronal mass ejection seems to be generally missing ahead and below Earths orbit, though it may give very slight impacts at Earth on 29th.

Solar Wind / Geomagnetic Activity: Solar wind speeds have fell from Strong to Slightly Elevated, though data quality from both satellites has been questionable. Total magnetic field strength has risen from weak to moderate, with the north-south component mostly negative, varying between +2/-9. Geomagnetic activity was Quiet to Unsettled (Kp 1-3) through the period.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to be mainly at Low levels, with a slight chance of Moderate-class flares.

Solar Wind / Geomagnetic Activity: Three possible coronal mass ejections feature in the forecast period, two which left the Sun on 24th and one from 25th. Possible arrivals start from late on 26th into early 27th, then 29th. The high speed stream from coronal hole 56 is expected to continue to wane early in the period before the possible arrival of the fast wind from coronal hole 57 on 26th or 27th. The leading edge of the high speed stream from coronal hole 59 is possible from late 28th or more likely early 29th.

Geomagnetic activity is forecast to be mainly Quiet to Unsettled (Kp 0-3) early 26th. Later on 26th and into 27th, Active or G1/Minor Storm intervals (Kp 4-5) become likely, due to possible coronal mass ejection arrivals and a chance of these combining with coronal hole fast winds. There is a very slight chance of G2/Moderate Storms (Kp 6) given the potential for a more direct arrival. Geomagnetic activity then likely becoming Quiet to Unsettled (Kp 0-3) 28th, before a chance of further Active or G1/Minor Storm intervals (Kp 4-5) on 29th due to either glancing coronal mass ejections or coronal hole fast wind arrivals.

Energetic Particles / Solar Radiation: No solar radiation storms are expected, with only a very slight chance should the largest sunspot group become more active.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	50	50	20	30
Strong	G3	No	5	5	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	20	20	20	20
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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